1970s timber framed house
South Gloucestershire

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Case study 33

£150 Saving on fuel bills

6% Reduction in carbon emissions

Measures installed	Total cost	Annual CO_2 saving (tonnes)	Annual fuel bill saving
Solar water heating	£4,660	0.30	£42
Air to Air heat pump	£4,350	0.00	£108
Total package	£9,010	0.30	£150

The home

This is a timber framed mid terrace house built in the 1970s. The home was heated by electric night storage heaters with hot water provided by an electric immersion heater and electric shower. Some improvements had recently been made internally to the wall insulation, and the loft insulation had been topped up to 200mm. Investigating methods to improve and update the heating system was a key interest for the owner.

What they did

As the home is rented out, the owner was keen to install a heating system that would be both cost effective for the tenant, and straightforward to maintain.

The existing heating system was therefore replaced with an air to air heat pump to provide space heating. A new evacuated tube solar thermal system will provide a proportion of the hot water requirement with a new hot water cylinder and immersion heater to top this up when necessary.

"The new space and water heating systems should help to make this a property that is comfortable and affordable to heat."

asiantaeth ynni SevernWye energy agency

South Gloucestershire Council

Air source heat pump

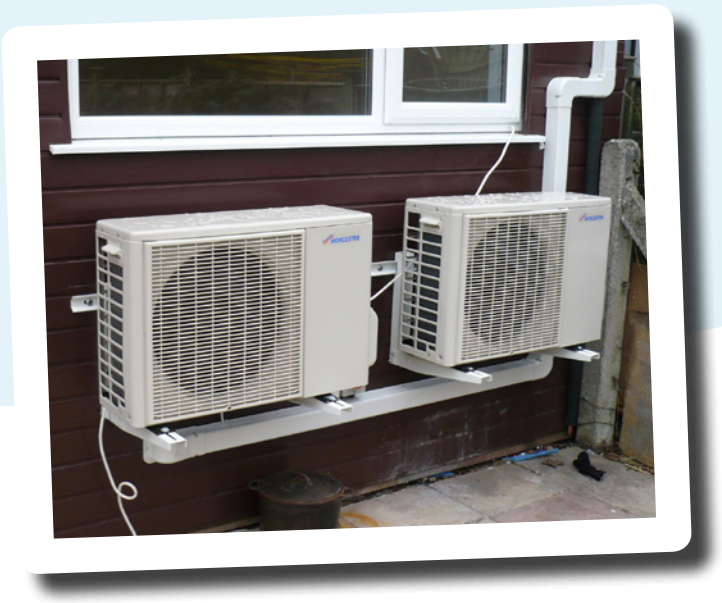
Replacing the old storage heaters with a modern and efficient alternative was the main priority for the home. Mains gas central heating would be the most obvious solution but this would require a connection to the gas network and the cost of this was prohibitive.

An alternative to mains gas heating was to replace the storage heaters with an air source heat pump. This would involve the installation of external fan units that would extract heat from the air and transfer this to the house via either wall mounted fan units or over-sized radiators.

Estimates were received from two installers covering three different types of system. One installer proposed an air-to-water system, which would take heat from the outdoor air and deliver it to the inside via eight over-sized radiators. The other installer proposed two different air-to-air systems, each with two external units but one with seven indoor distribution units and one with just two units.

It was decided that the simpler air-to-air system with two indoor units would be perfectly adequate for this modest property, Elite Efficient Energy from Stroud were employed to install the system.

The internal unit on the ground floor was positioned within the main living area, and the upper floor unit within the central landing area. These should be able to provide adequate heat to the surrounding rooms, and at a cost saving of around £100 a year compared to the electric storage heaters. The cost of installing this system was similar to the cost for gas connection and the fitting of a boiler and radiator system, however not using gas means that there is no requirement for an annual gas safety check, saving the landlord money and reducing disruption for the tenants.



The two air source heat pump units mounted on back wall of house

Solar water heating

The second recommendation taken forward from the Target 2050 report was the installation of a solar water heating system to reduce dependence on the electric immersion, the most expensive way to heat water. The rear roof of the house faces south, which is the optimum orientation for solar panels.

CJ Plumbing & Heating from Bristol installed an evacuated tube solar thermal system with a new 170 litre well insulated cylinder. This should provide a good proportion of the household's hot water over the year, particularly in the summer months.

The improvements made to the house have increased the energy efficiency rating on the Energy Performance Certificate from 58 (band D) to 74 (band C).

Energy consumption	Total (kWh)	Per m² floor area
Before improvement (2010)	11,747	135
After improvement (2011)	7,637	88
With all possible measures	6,165	71
UK average (2011)	19,800[1]	217[4]

CO_2 emissions	Total (tonnes)	Kg per m² floor area
Before improvement (2010)	4.96	57
After improvement (2011)	4.66	54
With all possible measures	2.62	30
UK average (2011)	6.00[2]	66[4]

Running costs	Total	Per m² floor area
Before improvement (2010)	£968	£11.15
After improvement (2011)	£818	£9.42
With all possible measures	£500	£5.76
UK average (2011)	£1,032[3]	£11.34[4]

[1] Ofgem 2011
[2] English Housing Condition Survey 2011
[3] Ofgem 2011
[4] Based on 91m² from English Housing Condition Survey 2011

Energy performance and carbon emissions in the Target 2050 exemplar homes have been modelled using the UK Standard Assessment Procedure (SAP). The savings data presented here is based on a standard occupancy pattern. This may not reflect actual usage by the building's current residents but is used to compare homes of different sizes and types in a way that assesses the building itself rather than the behaviour of any particular occupant.